



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.04.2013 Bulletin 2013/17

(51) Int Cl.:
F25D 17/06 (2006.01)

(21) Application number: **12183702.5**

(22) Date of filing: **10.09.2012**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **19.10.2011 TR 201110405**

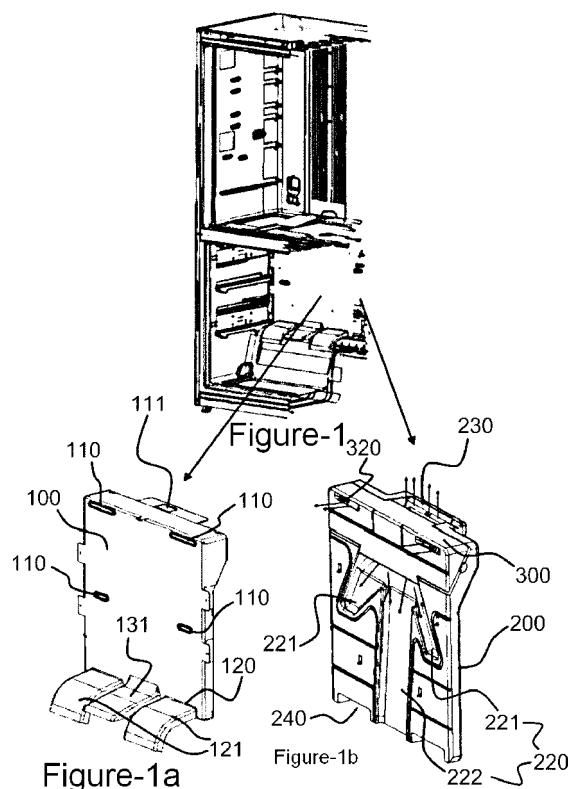
(71) Applicant: **Indesit Company Beyaz Esya Sanayi ve Ticaret Anonim Sirketi**
Manisa (TR)

(72) Inventors:
• **Acar, Mehmet Ali**
IZMIR (TR)
• **Kahraman, Volkan**
IZMIR (TR)
• **Kokgiran, Turgut**
MANISA (TR)

(74) Representative: **Iskender, Ibrahim**
Destek Patent, Inc.
Lefkose Cad. NM Ofis Park
B Block No: 36/5 Besevler
16110 Bursa (TR)

(54) **Fluid distribution system providing fluid routing by means of a transfer element**

(57) The present invention relates to a fluid distribution system employed particularly in refrigerators, coolers and deep freezers or in all systems where the fluid is transferred from one zone to another one by means of a transfer element (211) provided behind the front cover (100), wherein it comprises the following: fluid channel part (200) bearing said transfer element (211); at least one fluid channel (220) formed on the side of the fluid channel part (200) facing the front cover (100) and creating the gaps routing the fluid to different point or points; and at least one front cover distribution channel (110) formed on said front cover (100) and opening to said fluid channel (220).



Description**Field of the Invention**

5 [0001] The present invention relates to improvements made in the fluid distribution systems used in the areas where the fluid primarily used in refrigerators, coolers and deep freezers for different purposes is circulated after being treated with certain processes.

10 [0002] The present invention particularly relates to closed fluid distribution system that can be employed in systems where the fluid cold air is transferred from one zone to another one by means of a transfer element (fan, etc.) and that has increased heat and sound insulation.

Prior Art

15 [0003] As the basic operating principle, cold air is circulated in refrigerators, coolers and deep freezers for cooling the stored food or materials stored therein. Said air can heat up during operation. Thus, the heated air should be cooled. To do so, fan systems cooling the heated air are provided in the rear part of the coolers. Therefore, cooling the air and internal passage thereof is provided by means of a continuous circulation.

20 [0004] Structures of the existing systems are encountered during the literature research. One of them is the utility model with the publication number TR 2009 09870 and the title 'Cooler with Electronic Card and R290 Fluid'. Said invention relates to single cycle cooler providing storage and cooling of food and beverages such as packaged foods and soft drinks without being spoiled, keeping energy consumption at a minimum, equipped with compressor running with R290 hydrocarbon refrigerant and comprising a single evaporator, condenser, evaporator fan, condenser fan and capillary tube.

25 [0005] One of the other applications is the patent with the publication number TR 2010 05016 and the title 'Portable Cassette Type Cooling Unit'.

[0006] However, air leakage and insufficient sound insulation due to some gaps are encountered in the fan systems provided in existing structures. These two drawbacks reduce operating efficiency as well as cause increased energy consumption and noise pollution.

30 [0007] Thus, fluid distribution systems are needed in order to eliminate said drawbacks and improve existing structures.

Brief Description of the Invention

[0008] The invention is developed by being inspired from existing situations and seeks to solve the above mentioned drawbacks.

35 [0009] The present invention relates to the fluid distribution system that can be employed in all systems where the fluid, preferably air, is transferred from one zone to another one by means of a transfer element (fan, etc.) and that have increased heat and sound insulation.

40 [0010] The object of the present invention is to move the transfer element into a closed volume by means of the parts provided in front and rear part thereof and enable sending the fluid from intended zones to the other intended zones through the fluid channels thus formed by front cover and fluid channel part.

[0011] Another similar object of the present invention is to circulate the fluid in a chamber having larger volume and in required zones by enabling formation of fluid channels thanks to the fluid channel part and front cover channels.

[0012] Another object of the present invention is to increase efficiency by eliminating air leakage risk thanks to the transfer element being provided in a closed structure.

45 [0013] Another object of the present invention is to eliminate noise pollution thanks to the sound insulation part provided on the transfer element.

[0014] The structural and the characteristic features and all advantages of the present invention will be understood more clearly with the detailed description written by referring to the following figures and therefore, the evaluation needs to be done by taking these figures and the detailed description into consideration.

Figures**[0015]**

55 Figure 1 is the view showing the location of the system according to the present invention on the refrigerator/cooler.

Figure 1 a is the perspective front view of the front cover.

Figure 1b is the perspective front view of the assembled transfer element cover and fluid channel part.

Figure 2 is the cross sectional side view of the section where the system according to the present invention is located

on the refrigerator/cooler.

Figure 2a is the opposite angle view with respect to Figure 2 of the closed system according to the present invention.

[0016] Scaling of drawings is not absolutely required and details, which are not needed for understanding the present invention, can be neglected. Furthermore, elements, which are at least substantially identical or have at least substantially identical functions, are indicated with the same number.

Description of Part References

[0017]

100.	Front cover	220.	Fluid channel
110.	Front cover distribution channel	221.	Middle zone arm
111.	Upper distribution channel	222.	Lower zone arm
120.	Lower distribution channel	230.	Upper distribution channel
121.	Lower distribution part	240.	Fluid inlet
130.	Lower fluid inlet		
131.	Lower inlet part	300.	Transfer element cover
		310.	Sound insulation part
200.	Fluid channel part	320.	Fluid distribution channel
210.	Angled surface		
211.	Transfer element		
212.	Transfer element holder part		

Detailed Description of the Invention

[0018] The present invention relates to a fluid distribution system employed particularly in refrigerators, coolers and deep freezers or in all systems where the fluid is transferred from one zone to another one by means of a transfer element (211) provided behind the front cover (100).

[0019] The present invention is characterized in that it comprises:

- fluid channel part (200) bearing said transfer element (211);
- at least one fluid channel (220) formed on the side of the fluid channel part (200) facing the front cover (100) and creating the gaps routing the fluid to different point or points; and
- at least one front cover distribution channel (110) formed on said front cover (100) and opening to said fluid channel (220).

Preferred Embodiments of the Invention

[0020] In this detailed description, preferred embodiments of the cooling system according to the present invention are described only for a better understanding of the subject without constituting any restrictive effect. In the description of the preferred embodiments, 'air' expression is also used as the fluid.

[0021] Transfer element (211) described in the present invention is preferably a fan motor and a fan connected thereto. From this point on, it will also be referred to as fan or fan motor.

[0022] In Figure 1, location, on the refrigerator/cooler, of the fluid distribution system according to the present invention providing cold air flow is shown. Figure 1a is the perspective front view of the front cover (100). Figure 1b is the perspective front view of the assembled transfer element cover (300) and fluid channel part (200). Transfer element cover (300) enables said transfer element (211) to be provided in a closed volume on the fluid channel part (200) and routing of the fluid from the element (211) to at least said fluid channel (220).

[0023] The system according to the present invention as per the purpose thereof provides fluid routing to various different zones of the setting where the fluid will be distributed. For this purpose, at least one upper distribution channel (230) formed between said cover (300) and fluid channel part (200) and enabling routing of the fluid to the upper portion of the system is provided. Accordingly, at least one front cover upper distribution channel (111) formed on said front cover (100) and opening to said upper distribution channel (230) is provided (Figure 1 a and Figure 1 b).

[0024] At least one fluid distribution channel (320) enabling routing of the fluid to at least another area on the transfer element cover (300) other than the fluid channel (220) is also used. As illustrated in Figure 1b, preferably at least two

of said channels (320) are provided. Thus, fluid (air, etc.) can be sent to the upper front portion of the system. Front cover distribution channels (110) compatible with said channels, formed on said front cover (100) and opening to said fluid distribution channels (320) are provided.

[0025] Channel structure is formed in the internal section when, thanks to the form of the surface of the fluid channel part (200) facing the front cover (100), the part (200) and the front cover (100) are mutually closed. The fluid channel (220), one of the most important aspects of the present invention, comprises at least one middle zone arm (221) extending till the middle zone of the system and at least one lower zone arm (222) extending till the lowest zone of the system (Figure 1b). Said arms (221, 222), as illustrated in Figure 1b, are formed such that of a lower zone arm (222) extends directly to the lower zone from a middle point and two middle zone arms (221) extend to both sides thereof. Accordingly with said arms, front cover distribution channels (110) formed on said front cover (100) and opening to said middle zone arms (221) and at least one front cover lower distribution channel (120) opening to lower arm (222) are formed. A lower distribution part (121) is specifically formed in the outlet of the lower distribution channel (120). Thus, routing of the fluid exiting from the lower distribution channel (120) to the lower section of the system is provided.

[0026] Preferably two fluid inlets (240), apart from said channels (110, 111, 120, 220, 230, 320), are formed in the lower section of the fluid channel part (200) in order to provide introduction of fluid into the system, i.e. rear part of the system where the transfer element (211) is located. Front cover lower fluid inlets (130), each corresponding to said inlets, formed on front cover (100) and opening to said fluid inlets fluid (240) are provided. Lower inlet parts (131) enabling fluid withdrawal from the lower section of the system are used in front of said lower fluid inlets (130) (Figure 1 a).

[0027] Figure 2 is the cross sectional side view of the section where the system according to the present invention is provided on the refrigerator/cooler. As can be seen from the figure given, air is drawn from zone A. Cold air is sent to zone B. Figure 2a is the opposite angle view with respect to Figure 2 of the closed system according to the present invention. As can be seen in Figure 2a, the fan (211) is positioned at an oblique angle. An angled surface (210) allowing for positioning of said fluid channel part (200), said front cover (100) at an angle between 0° to 90° in the opposite direction of the transfer element (211) is provided. A gap provided between rear surface of the cooler and the channel part (200) is guaranteed thanks to the angled surface (210). Fan holder element part (212) for fixing the fan, preferably made of plastic is provided below the fan motor (211). Sound insulation part (310) is positioned between said cover (300) and transfer element (211) in order to reduce the noise generated by the transfer element (211).

[0028] Detailed description of the functioning of the present invention is as follows. The fan motor (211) provided between transfer element cover (300) and fluid channel part (200) sends the cooling air drawn thereby from zone A by means of the front cover lower inlet part (131) to zone B by means of the channels (110, 111, 120) provided on the front cover (100). In addition, cold air also flows to zone B through distribution channels of the transfer element cover (320) and said upper distribution channel (230). Then, in order to provide continuation of circulation, the air in zone B is transferred to zone A upon operation of the fan (211) by means of the front cover lower air inlet part (131) provided in zone B and said air can be sent to the intended part of zone B again by means of the channels (110, 111, 120) provided on the front cover (100). Circulation directions of the air can be seen in Figures 2 and 2a.

[0029] In a preferred embodiment of the present invention, the number of channels (110, 111, 120, 130, 220, 230, 240, 320) can be increased or decreased. In addition, angle and direction of the channels (110, 111, 120, 130, 220, 230, 240, 320) can also be modified.

Claims

1. A fluid distribution system employed particularly in refrigerators, coolers and deep freezers or in all systems where the fluid is transferred from one zone to another one by means of a transfer element (211) provided behind the front cover (100), **and it is characterized in that** it comprises the following:

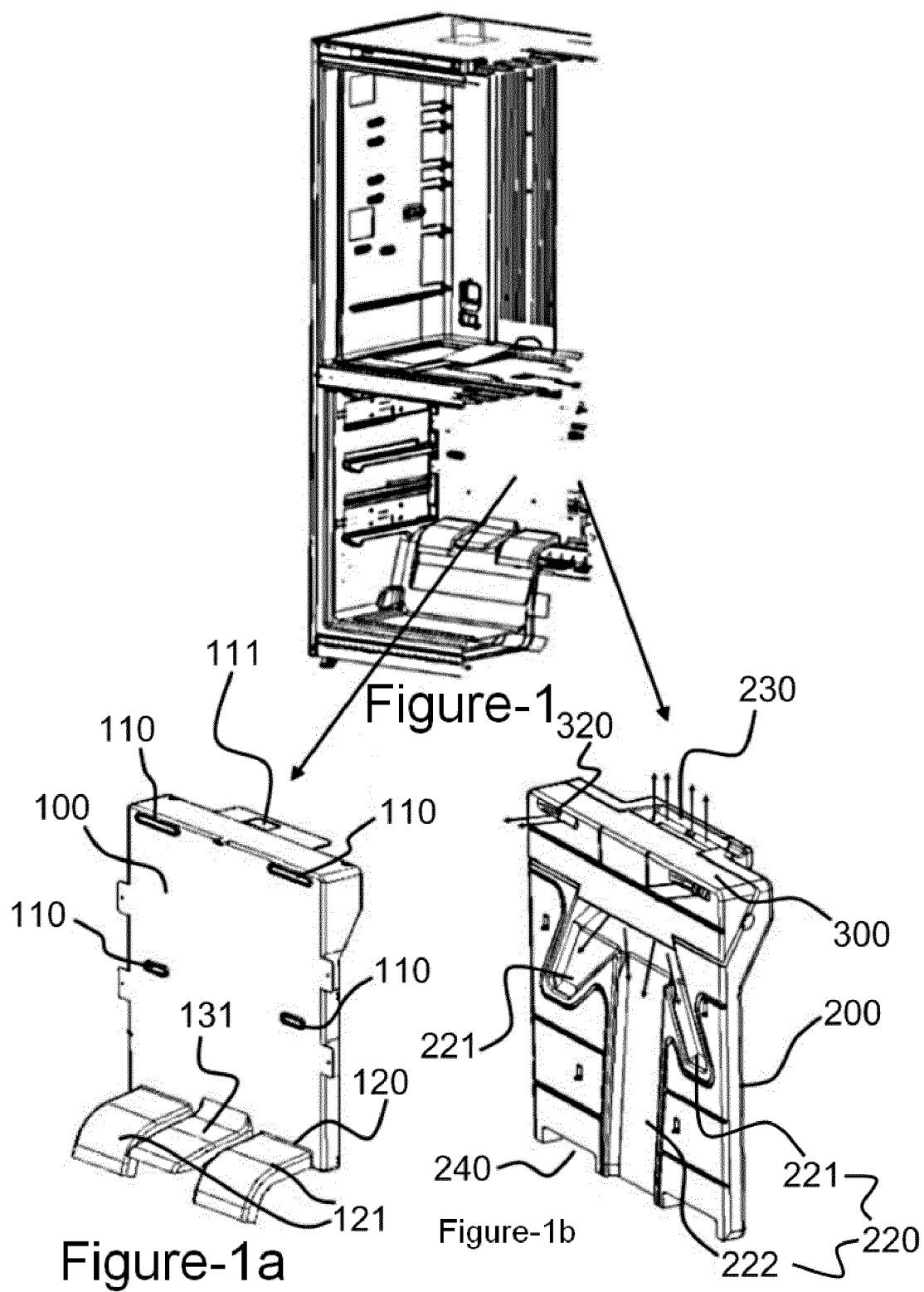
- fluid channel part (200) bearing said transfer element (211);
- at least one fluid channel (220) formed on the side of the fluid channel part (200) facing the front cover (100) and creating the gaps routing the fluid to different point or points; and
- at least one front cover distribution channel (110) formed on said front cover (100) and opening to said fluid channel (220).

2. A fluid distribution system according to claim 1, **and it is characterized in that** it comprises an angled surface (210) allowing for positioning of said fluid channel part (200), said transfer element (211) at an angle between 0 to 90 in the opposite direction of the front cover (100).

3. A fluid distribution system according to claim 1, **and it is characterized in that** it comprises transfer element cover (300) enabling said transfer element (211) to be provided in a closed volume by being positioned on the fluid channel

part (200) and routing of the fluid from the element (211) to at least said fluid channel (220).

4. A fluid distribution system according to claim 3, **and it is characterized in that** it comprises sound insulation part (310) positioned between said cover (300) and transfer element (211) in order to reduce the noise generated by the transfer element (211).
5. A fluid distribution system according to claim 3, **and it is characterized in that** it comprises at least one upper distribution channel (230) formed between said cover (300) and fluid channel part (200) and enabling routing of the fluid to the upper portion of the system.
6. A fluid distribution system according to claim 5, **and it is characterized in that** it comprises at least one front cover upper distribution channel (111) formed on said front cover (100) and opening to said upper distribution channel (230).
7. A fluid distribution system according to claim 3, **and it is characterized in that** said cover (300) comprises at least one fluid distribution channel (320) enabling routing of the fluid to at least another area other than the fluid channel (220).
8. A fluid distribution system according to claim 7, **and it is characterized in that** it comprises at least one front cover distribution channel (110) formed on said front cover (100) and opening to said fluid distribution channel (320).
9. A fluid distribution system according to claim 1, **and it is characterized in that** said fluid channel (220) comprises at least one middle zone arm (221) extending till the middle zone of the system.
10. A fluid distribution system according to claim 9, **and it is characterized in that** it comprises at least one front cover distribution channel (110) formed on said front cover (100) and opening to said middle zone arm (221).
11. A fluid distribution system according to claim 1, **and it is characterized in that** said fluid channel (220) comprises at least one lower zone arm (222) extending till the lowest zone of the system.
12. A fluid distribution system according to claim 11, **and it is characterized in that** it comprises at least one front cover lower distribution channel (120) formed on said front cover (100) and opening to said fluid channel lower arm (222).
13. A fluid distribution system according to claim 12, **and it is characterized in that** it comprises lower distribution part (121) enabling routing of the fluid from said front cover lower distribution channel (120) to the lower section of the system.
14. A fluid distribution system according to claim 1, **and it is characterized in that** said fluid channel part (200) comprises at least one fluid inlet (240) through which the fluid to be distributed passes to the rear section of the system where transfer element (211) is provided.
15. A fluid distribution system according to claim 14, **and it is characterized in that** it comprises at least one front cover lower fluid inlet (130) formed on said front cover (100) and opening to said fluid inlet (240).
16. A fluid distribution system according to claim 15, **and it is characterized in that** it comprises lower inlet part (131) enabling introduction of fluid into said front cover lower fluid inlet (130) from the lower section of the system.
17. A fluid distribution system according to claim 1, **and it is characterized in that** said transfer element (211) is fan.



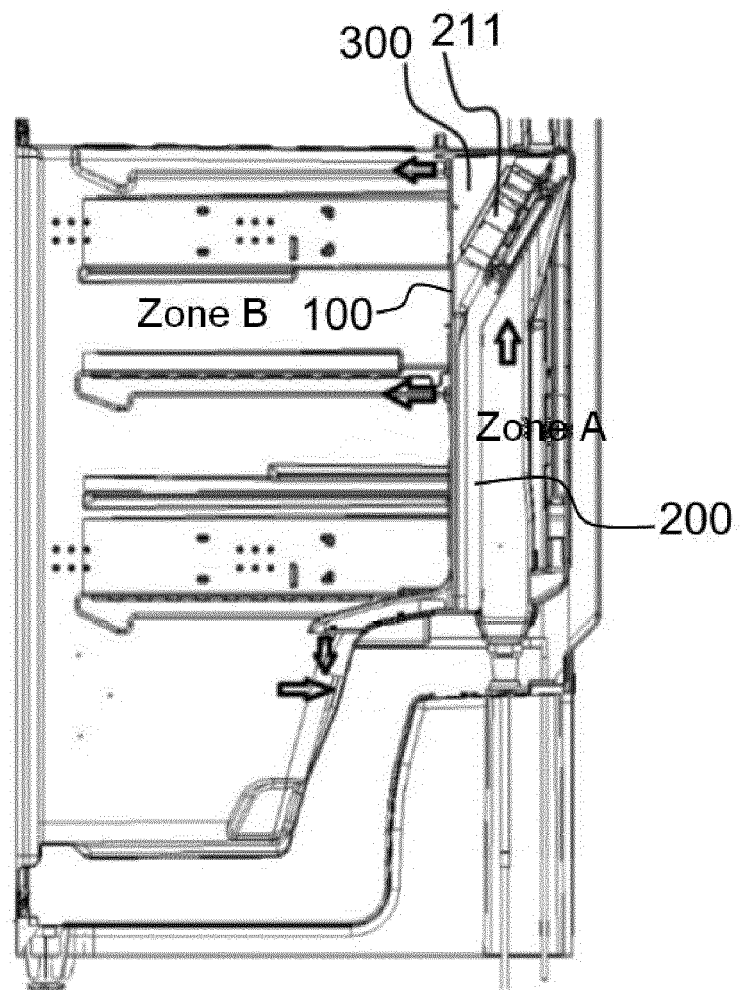


Figure-2

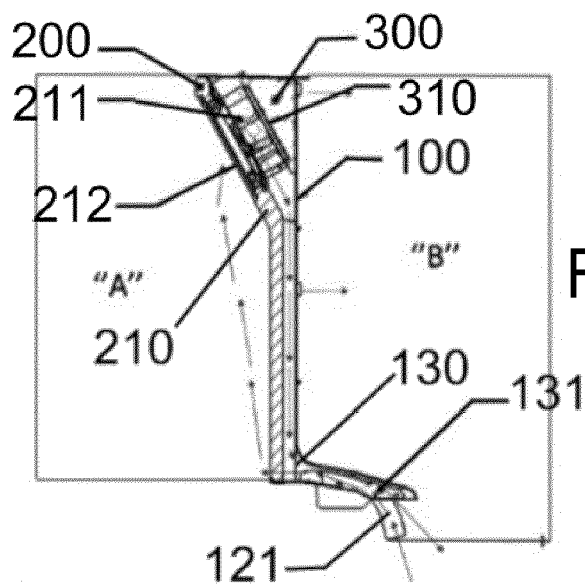


Figure-2a

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- TR 200909870 [0004]
- TR 201005016 [0005]